

Claims

1. A mask comprising:
a thin film;
a protective film formed on a part of the
5 thin film;
a supporting frame formed on the thin film to
surround the protective film; and
holes formed in the thin film and the
protective film for allowing a charged particle beam or a
10 electromagnetic wave irradiated on the protective film
side to pass.
2. A mask as set forth in claim 1, wherein
the charged particle beam is an ion beam.
3. A mask as set forth in claim 1, wherein
15 a thickness of the protective film is
determined in accordance with accelerating energy of ion
implantation in an ion implantation step wherein the mask
is used.
4. A mask as set forth in claim 1, wherein
20 a material of the protective film includes a
photosensitive resin.
5. A mask comprising:
a first thin film;
a supporting frame formed on a part of a
25 first surface of the first thin film;

a second thin film formed on a second surface of the first thin film; and

holes formed in the first and second thin films in a portion surrounded by the supporting frame for
5 allowing a charged particle beam or a electromagnetic wave irradiated on the first surface side to pass;

wherein impurities are introduced into at least one of the first thin film and the second thin film to control a internal stress thereof.

10 6. A mask as set forth in claim 5, wherein the charged particle beam is an ion beam.

7. A mask as set forth in claim 5, wherein a thickness of the first thin film is determined in accordance with accelerating energy of ion
15 implantation in an ion implantation step wherein the mask is used.

8. A mask as set forth in claim 5, wherein a thickness of the second thin film and the internal stress are determined in accordance with a size
20 of a portion surrounded by the supporting frame.

9. A mask as set forth in claim 5, wherein the impurities are introduced by an ion implantation, and annealing is performed after the ion
implantation introducing the impurities into at least one
25 of the first thin film and the second thin film.

10. A method of producing a mask comprising the steps of:

forming a thin film on a substrate via a sacrificial film;

5 forming a supporting frame made by the substrate by removing a part of the substrate until the sacrificial film is exposed;

forming first holes in the thin film in a portion where the supporting frame is not formed;

10 removing the sacrificial film in the portion where the supporting frame is not formed;

forming a protective film on a first surface of the thin film being supporting frame side in the portion where the supporting film is not formed;

15 forming second holes self-aligned to the first holes in the protective film.

11. A method of producing a mask as set forth in claim 10, wherein

the step of forming the protective film
20 includes a step of adhering a photosensitive resin film, and

the step of forming the second holes includes a step of exposing the protective film from a second surface of the thin film via the first holes and a step
25 of developing the protective film thereby an exposed

portion is removed.

12. A method of producing a mask as set forth in claim 10, wherein

the step of forming the second holes includes
5 a step of performing an etching on the protective film by using the thin film as a mask.

13. A method of producing a mask as set forth in claim 10, wherein

the step of removing the sacrificial film in
10 the portion where the supporting frame is not formed is performed after the step of forming the first holes.

14. A method of producing a mask comprising the steps of:

forming a first thin film on a substrate via
15 a sacrificial film;

introducing impurities into the first thin film for adjusting an internal stress of the first thin film;

forming a second thin film on the first thin
20 film;

forming a supporting frame made by the substrate by removing a part of the substrate until the sacrificial film is exposed;

forming holes in the first thin film and the
25 second thin film in a portion where the supporting frame

is not formed;

removing the sacrificial film in the portion where the supporting frame is not formed.

15 15. A method of producing a mask as set forth in claim 14,

 further comprising a step of introducing impurities into the second thin film for adjusting an internal stress of the second thin film after the step of forming the second thin film and before the step of forming the supporting frame.

 16. A method of producing a mask as set forth in claim 14, wherein

 the step of removing the sacrificial film in the portion where the supporting frame is not formed is performed before the step of forming the holes.

 17. A method of producing a mask comprising the steps of:

 forming a first thin film on a substrate via a sacrificial film;

20 forming a second thin film on the first thin film;

 introducing impurities into the second thin film for adjusting an internal stress of the second thin film;

25 forming a supporting frame made by the

substrate by removing a part of the substrate until the sacrificial film is exposed;

forming holes in the first thin film and the second thin film in a portion where the supporting frame
5 is not formed;

removing the sacrificial film in the portion where the supporting frame is not formed.

18. A method of producing a mask as set forth in claim 17, wherein

10 the step of removing the sacrificial film in the portion where the supporting frame is not formed is performed before the step of forming the holes.

19. A method of producing a semiconductor device including a step of performing an ion implantation via a
15 mask on a desired portion of a substrate, wherein

a mask comprising:

a thin film;

a protective film formed on a part of the thin film;

20 a supporting frame formed on the thin film to surround the protective film; and

holes formed in the thin film and the protective film for allowing a charged particle beam or a electromagnetic wave irradiated on the protective film
25 side to pass

is used as the mask.

20. A method of producing a semiconductor device including a step of performing an ion implantation via a mask on a desired portion of a substrate, wherein

5 a mask comprising:

a first thin film;

a supporting frame formed on a part of
a first surface of the first thin film;

a second thin film formed on a second
10 surface of the first thin film; and

holes formed in the first and second
thin films in a portion surrounded by the supporting
frame for allowing a charged particle beam or a
electromagnetic wave irradiated on the first surface side
15 to pass;

wherein impurities are introduced into
at least one of the first thin film and the second thin
film to control a internal stress thereof

is used as the mask.